CLAIMS

We claim:

1. A system to provide performance control of a radioisotope generator, said system comprising:

a radioisotope generator;

an electronic sensor of elution;

an eluted activity measurement sensor;

a device to measure the nuclear quality of the eluted radioisotope;

an electronic memory with information to the user;

a communication interface and

an user interface software.

2. A system according to claim 1, wherein said radioisotope generator is a Mo-99 / Tc-99m generator.

3. A system according to claim 1, wherein the electronic sensor of elution measures changes in high frequency conductometry.

4. A system according to claim 1, wherein the eluted activity sensor can be either a Geiger Müller tube, a micro ionization chamber or a solid state detector.

5. A system according to claim 1 wherein the electronic memory with information to the user includes: Lot No., Generator No., activity, calibration date and expiration dates.

6. A system according to claim 1, wherein the communication interface uses one or more of the following ports of a PC: RS232, USB, or parallel port.

7. A system according to claim 2, wherein the device to measure the nuclear quality of the eluted Tc-99m consists of a radioactivity sensor protected by a 3 mm lead shield.

8. A system according to claim 1, wherein the electronic sensor of elution measures changes in photon intensity passing through a portion of the elution tubing which is transparent to these photons.

9. A system according to claim 1, wherein the electronic sensor of elution measures changes in the electrical impedance of a portion of the elution tubing.

10. A system according to claim 1, wherein the electronic sensor of elution measures changes in the dielectric capacity of a portion of the elution tubing.

11. A method to detect and measure passage of elution in a radioisotope generator based on one of the following:

High-frequency conductometry;

Photometry;

Impedanceometry;

Electrical capacitometry;

Emitted radiation detection; and

Magnet-hydrodynamic.

12. A method according to claim 11, wherein high frequency conductometry measures the changes in the electrical resistance of a portion of the elution tubing of said generator.

13. A method according to claim 11, wherein photometry measures the changes in the intensity of a light beam going through a translucent portion of the elution tubing by means of a high intensity light emitter pointed to the translucent portion of the elution tubing, and a phototube/photomultiplier placed on the other side of the translucent portion of said elution tubing of said radioisotope generator, and directly opposite to the light emitter.

14. A method according to claim 11, wherein impendanceometry measures the changes in the frequency of a free oscillator (rod-capacitor) by means a coil surrounding a portion of the elution tubing and a free oscillator connected to the coil; wherein a frequency counter detects impedance changes of the coil if liquid passes through.

15. A method according to claim 11, wherein capacitometry measures the changes in the dielectric capacity by means of two electrodes placed externally on both sides of a portion of the elution tubing, the tubing being non-metallic with an external diameter of not more than 2 mm, the liquid changing the internal dielectric constant of this capacitor formed by the electrodes and the tubing, and a capacitometer being connected to these electrodes measures the changes of the capacity when liquid passes through the tubing.

16. A method according to claim 11, wherein emitted radiation detection measures the changes in the radiation field generated by the eluted radioisotope passing through the elution tubing of said radioisotope generator, by means of a properly-shielded-from-other-sources-of-radiation radiation detector placed against said elution tubing of said radioisotope generator.

17. A method according to claim 11, wherein magnet-hydrodynamic measures the changes to the orthogonal electric field generated by a magnetic field applied to the elution tubing by means of a magnetic field applied on a portion of the elution tubing, two electrodes orthogonal to the magnetic field measuring a low electric field that is function of the liquid flow, and when the liquid passes through the tubing, the electric field increases and thereby indicates the elution.

18. A method to measure the dryness of a "dry" Mo-99 / Tc-99m generator wherein high frequency conductometry measures the changes in the electrical resistance through the column by means of electrodes placed on the IN and on the OUT metal tubing or needles of said generator.

19. A method to detect and measure the radionucleidic purity of the Tc-99m as it is eluted from a Mo-99 / Tc-99m generator that measures the changes in the radiation field generated by the eluted radioisotope passing through the elution tubing of said radioisotope generator, by means of a second properly-shielded-from-other-sources-of-radiation radiation detector placed against a 3mm thick lead shield, which is in direct contact with said elution tubing of said radioisotope generator.

20. A method to transmit the data generated according to the methods in claims 11, 18 and 19 to a PC or data processor through a RS232 or USB or a parallel port or any other input-output port of a PC.

21. A method according to claim 5, wherein the electronic memory is a non-volatile memory such as EEPROM, and said memory, upon connecting the system to the PC transfers to the program the information stored by the manufacturer specific to that particular generator.

22. An user interface software according to claim 1 , which process and logs all the data introduced from the generator as known to those skilled in the art.